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The Name Game at NSF

The Science and Engineering Foundation? Not Yet

The old academic guard around the National Science Foundation has beaten back another Congressional attempt to rename and remodel NSF as the National Science and Engineering Foundation. But the defenders lost out when proponents of change shrewdly settled for amendments that add "and engineering" to every reference to "science" in NSF's basic legislative charter.

The amendments, adopted March 22 by the House Science and Technology Committee, still face a long and uncertain course through the legislative mill. But testimony before the Committee suggested that the pure-science traditionalists are on the run when it comes

had established an Engineering Directorate in 1981, the Director pointed out that the Foundation's spending on engineering had risen from \$54 million to \$147 million since then. "While we have concluded that the proposed changes are not objectionable to the Foundation," he added, "we are somewhat troubled by the speed and lack of debate which has accompanied this amendment"—an odd assessment, given that the debate about NSF and engineering has, in one way or another, been going on for at least 20 years.

The most insightful repartee in these generally arid
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GAO Cites Lack of Audits on NIH Indirect-Cost Payments—Page 3

to controlling the Foundation's affairs, and that regardless of the outcome of the name-game controversy, engineering has a bright future at NSF. The principal witness for keeping things as they are at NSF, Frank Press, President of the National Academy of Sciences, conceded as much when he argued that NSF was already giving increased emphasis to engineering, though the budget share is now only 10 percent.

Because of this, Press argued, there was no need for the big changes in the NSF Act originally proposed by Rep. George E. Brown Jr., (D-Calif.), or even for the lesser ones in a substitute amendment by Rep. Joe Skeen (R-NM). The hearing, by the full Committee, was held after what came to be known as the Skeen Substitute was adopted by the Subcommittee on Science, Research and Technology a week earlier, thereby setting off alarms.

A statement read for NSF Director Edward A. Knapp—who was off on brief visit to Japan with White House Science Adviser George A. Keyworth II—did not lock horns with the Committee, but indicated that the NSF management preferred things as they are. Knapp said he had no objections to the changes proposed in the Skeen amendments, but added that in regard to NSF's basic legislation, "we are pleased to note that the Congress has wisely refrained from frequent revisions of a substantive nature, and we believe that the stability this has provided has had much to do with the Foundation's success."

Knapp's statement also took the route of saying that we're doing it anyway, so why bother? Noting that NSF

In Brief

The NIH high command is optimistic about a Congressional reprieve from the austere budget that the Administration has requested for Fiscal 1985. At House Appropriations hearings, Chairman William H. Natcher (D-Ky.) repeatedly said he didn't like what amounts to a standstill budget for NIH. In similar circumstances, he said the same thing last year—and delivered an increase of around 10 percent.

Meanwhile, the Washington lobby for the social sciences has produced gloomy, if somewhat complicated, budget calculations concerning how those disciplines have been faring in recent years. They're deep in the hole, says the Consortium of Social Science Associations. In 1978, NSF's Division of Social and Economic Sciences was budgeted for the equivalent of \$166 million in 1972 dollars; last year, the value was down to \$95 million, COSSA reports. A big decline was also found in NSF's Division of Behavioral and Neural Sciences.

"Never look back" seems to be the guiding rule of Washington's ever-booming report-writing industry. But, in a rare departure, the Commission on Behavioral and Social Sciences and Education at the National Academy of Sciences has examined "what becomes of CBASSE reports once they are delivered to their sponsors and published." Several were found to have had influence, but the Commission is candid about the fate of a 1976 product, "Toward a National Policy for Children and Families," noting that "There are no known direct effects of the report; it has not influenced national policy in any discernible way." It is, however, a minor best-seller: 8500 sold, with continuing sales of about 20 a month.

... NAS President Doubts Support of Engineer Academy

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proceedings was delivered by Rep. Brown, a longtime friend of NSF and science who is well-acquainted with the arguments that the mandarins of research regularly trot out to support their interests.

In an exchange with Science Academy President Press, Brown observed that Robert M. White, President of the National Academy of Engineering—a restless subsidiary of the Science Academy—had expressed support for the Skeen Amendment. Brown pointed out that White, in a letter dated March 19 to the Subcommittee that had held the earlier hearings, had endorsed the amendments as “a positive step,” and, in effect, said they ratify what the Foundation was doing anyway in regard to engineering.

In response to Brown’s point about support of the Academy of Engineering, Press said that “He [White] and I talked about this. By the nature of his constituency, he couldn’t come here and oppose this amendment.”

Brown then gently inquired about Press’s constituency, and was rewarded with a commentary about the Science Academy’s past support for giving engineering its due in the National Science Foundation. Press said that passage of the engineering amendments might encourage “discipline-of-the-month” depredations against NSF—a reference to the so-called disease-of-the-month lobbies directed at the National Institutes of Health. He also argued that NSF was intended to be,

and has functioned as, the special federal agency for supporting basic research that arouses little or no interest in other parts of the federal government—thus fulfilling what’s referred to as the “balance wheel” function. In contrast, he reminded the Committee, support for research and training in engineering is provided by several major federal agencies—including such big spenders as Defense, NASA, and Energy. And, he argued that while the present Congress had demonstrated sensitivity toward the role of NSF in support of basic research, the amendments could be used to upset things years from now. Perhaps the most sensible testimony of the day was offered in behalf of the American Association for the Advancement of Science by AAAS Associate Executive Officer J. Thomas Ratchford. He pointed out that the “Skeen amendment will not license NSF to do anything it cannot do or is not doing already. The [NSF] Organic Act,” he testified, “clearly considers engineering to be a member of the family of science.”

A senior member of the NSF staff told SGR that the amendment wouldn’t make much difference in NSF’s operations. Why, then, the fuss and big push by the friends of engineering? The NSF man explained: “It’s like the restaurant owner: who’s asked why he serves a lot of flaming dishes, and answers, ‘The customers like it and it doesn’t hurt the food.’”

The political reality of the situation is that, with or

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Academy Starts Study of Science-Education Research

A Committee on Research in Mathematics, Science, and Technology Education has been established by the National Academy of Sciences to carry out a one-year study under a \$100,000 grant from the National Institute of Education. The sum is small, but the Committee contains several influential figures, and there are hopes that additional funds may be rounded up.

Chaired by Professor James G. March, of the Stanford Graduate School of Business, the Committee held its first meeting March 20. Its agenda calls for reviewing some of the recent studies on science-related education, and also for commissioning papers. The National Science Foundation, which has been dawdling in carrying out its revived responsibilities in science education, is looked upon as a possible source of additional funds. The Study Director is Senta A. Raizen, formerly of NIE and NSF, who has headed other projects for the Academy’s Commission on Behavioral and Social Sciences and Educa-

tion, which is managing the study. Members of the Committee are:

Arnold B. Arons, Physics Dept., Univ. of Washington
W.O. Baker, Bell Labs
Victoria Bergin, Texas Education Agency
Jerome S. Bruner, Psychology Dept., New School for Social Research
Michael Cole, Psychology Dept., UC San Diego
Allan M. Collins, Bolt Beranek & Newman
Margaret B. Davis, Ecology and Behavior Biology Dept., Univ. of Minnesota
Robert Glaser, Learning Research and Development Center, Univ. of Pittsburgh
Andrew M. Gleason, Math Dept., Harvard
Jill H. Larkin, Psychology Dept., Carnegie-Mellon
Robert W. Loewy, Rensselaer Poly.
Cora B. Marrett, Center for Education Research, Univ. of Wisconsin
Samuel J. Messick, Ed. Testing Service
Paul E. Paterson, Brookings Inst.
David E. Wiley, Dean of Ed., Northwestern Univ.
J. Tuzo Wilson, Ontario Science Center

GAO Cost Study Says Audits Rare on NIH Payments

The General Accounting Office (GAO) has finally issued a report on its longrunning inquiry into the mysteries of indirect-cost payments to universities receiving grants from the National Institutes of Health. And, as has been rumored about (SGR Vol. XIII, No. 18), the GAO investigators say they were unable to figure out completely why ever-growing gobs of NIH research funds are being consumed by departmental administrative costs.

Part of the reason, they suggested, is that audits are rare, a suspicion supported by the finding that in the relatively few instances where audits have been conducted, substantial sums claimed for indirect costs have been disallowed. Thus, in 41 audits conducted between 1977 and 1983, the GAO noted, \$64 million was disallowed in claims totaling \$515 million. Small stuff, some might say, but amounts like that can cover quite a few of those NIH applications that get relegated to the frustrating category of "approved but unfunded."

The background to all this, of course, is that academe is ravenous for money, and the bundle from Bethesda is an easy mark. As such, it naturally aroused the interest of Senator William Proxmire (D-Wisc.), a relentless budgetminder, and Senator Paula Hawkins (R-Fla.),

who flits about in quest of something to be concerned with. They both asked the GAO in 1981 to look into the matter. Never in a hurry, the agency picked away at the subject in off-and-on fashion for two years, then was required to wait for six months while its draft report underwent leisurely examination in other wings of the federal establishment.

Often referred to as Congress's "watchdog," the GAO registers the fact that the Department of Health and Human Services (HHS), which runs the bookkeeping for NIH, has been fairly relaxed about obtaining justifications for substantial increases in indirect-cost claims by NIH's academic clients. But the GAO sensitively steers away from unpleasant assertions or conclusions from its examination of indirect-cost reimbursements at 82 of the 200 institutions that received more than \$3 million a year in direct-costs from NIH in 1980-82.

The closest it comes to acknowledging academe's adoption of the Willie Sutton Rule is in an explanation attributed to an unnamed officials of HHS: "The need for additional funds has caused grantees to adopt more sophisticated cost allocation techniques which maximize the amount of allowable reimbursements for indirect costs." In characteristic GAO lingo, the report, 49 pages, is titled *Assuring Reasonableness of Rising Indirect Costs On NIH Research Grants—A Difficult Problem*.

Bench scientists dismayed by the diversion of research funds to front-office functions will have no difficulty figuring out what the GAO is talking about, nor will academic managers, who upped indirect costs as a percentage of research costs from 21 to 30 percent between 1972 and 1982; looked at in terms of percent of indirect to direct costs, the former rose during that decade from 25.1 to 42.8 percent. Last year, the GAO report shows, NIH awarded \$2.3 billion in "research" grants, but only \$1.6 billion got to the lab; the rest was taken for indirect costs, which are defined as non-re-

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without major or minor amendments concerning engineering, NSF is under irresistible pressure to enlarge its support for that area. In recent years, engineering has been the fastest-growing sector of activity in the Foundation. Given the economic rationale that now propels federal support for scientific and technical programs, the growth is bound to continue.

The situation provides a golden opportunity for pressing for more money for both science and engineering. However, NSF's most influential supporters, the physical scientists, aren't in a hustling mood these days. Under the Reagan Administration, they have fared far better than they ever expected, and they are hesitant to clamor for more.

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... Report Too Late to Affect Administration Policy

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search activities—such as administration, library services, and so forth—presumably generated by NIH-supported research activities.

A persistent note throughout the GAO report is that documentation in support of rising indirect-cost claims is non-existent, sparse, or involves "subjective" matters, such as time accounting among teaching, research, and administration. The report cites the case of an unnamed university whose total indirect costs rose by \$3.1 million, or 41 percent, between 1980. Over half of that amount was traced to a 185-percent increase in the medical school's "departmental administration expense." A negotiator from the Department of Health and Human Services concluded that "The only possible

area of contention appears to rest in what constitutes a full teaching load or percentages thereof based on the number of courses being taught by instructors in the various departments. Results of reviews in this area would be highly subjective and since the basic data was not in a format that would lend itself to statistical sampling techniques this matter was not pursued at this time."

If the report had come out a year or two ago, it would have provided support for the Reagan Administration's efforts to trim indirect-cost payments. But, after the medical school lobby twice defeated attempts to cut 10 percent from NIH's indirect-cost reimbursements, the Administration backed off. In the view of George A. Keyworth II, the President's Science Adviser, academic science needs the money, even if the bookkeeping is questionable.

The GAO report is scheduled to be discussed at NIH's coming round of Senate Appropriations hearing, but it's not likely to touch off any upheavals. As the report notes, HHS has instituted several changes in accounting techniques for indirect costs and new guidelines are scheduled to be issued in June. The changes won't reduce the take for universities, but they will help divert any Congressional pressures that might arise on the subject.

(The report is available without charge from US General Accounting Office, Document Handling and Information Services Facility, PO Box 6015, Gaithersburg, Md., 20760; tel. 202/275-6241. Specify GAO/HRD-84-3, March 16, 1984.)

The Case of "University C"

The GAO report on indirect costs lists by name the 82 universities whose finances were examined, along with direct and indirect reimbursements they received in fiscal 1982. But the report doesn't state which of them did what in regard to possibly dubious practices that were encountered in the course of the GAO inquiry. For example, there's the institution identified only as "University C," of which the report states the following:

Total indirect costs negotiated for 1980 increased \$390,000, or 16 percent, over 1979. The largest indirect-cost pool—departmental administration—increased \$373,000, or 69 percent. The direct-cost base increased \$1.3 million, or 37 percent.

The [government] negotiator noted . . . that the university's effort reporting was quite complicated and difficult to understand. He noted that he believed many of the effort reports reviewed overstated time claimed as departmental administration and, based on his review, he negotiated a \$50,000 reduction to the \$964,000 proposed for departmental administration.

. . . [A]lthough federal funds at this university were relatively small, [the negotiator] regarded the indirect-cost rate he negotiated to be too high, and he was convinced an audit would prove this to be true. He noted that without an audit, the university administrators were very adamant about the accuracy of their indirect-cost study, even when presented with evidence to the contrary. He also noted that the last audit of this university was in 1970 . . .

In Print

User's Guide to DOE Facilities, describes equipment and services available for use by outside researchers at 20 R&D centers of the US Department of Energy; includes details about eligibility, persons to contact, etc.

(185 pages, a limited number of free copies available from Department of Energy, Office of Energy Research, ER-44, Attn. John Ortman, Washington, DC 20585.)

Diffusion of Biomass Energy Technologies in Developing Countries, second edition, report by the National Academy of Sciences' Board on Science and Technology for International Development, with financial assistance from the Rockefeller Foundation, focuses on energy needs of rural and urban poor.

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Hardliners Gaining in Science and Secrecy Controversy

The Administration's hardliners have been coming out ahead lately in the long-running contention over freedom of scientific communication and exports of high-tech products.

A major clue to where things stand in this murky area came last week when the White House gave the Defense Department increased authority over export controls. The export-promoting Commerce Department remains in the picture as the routine administrator of export licenses. And any conflict between the two will be referred to the National Security Council for settlement. But the decision to put Defense ahead of Commerce is a clear victory for the hardliners and signifies their growing dominance over the issue.

The detectable effects on academic research have been spotty, but there is no sure way of measuring the intimidation factor that flows from the Defense Department's growing concern with unclassified research that it considers "sensitive."

No one has defined just what that is—which means that DoD's zealots are at liberty to do what they please

on the subject. But the issue of restrictions on "sensitive" research has become increasingly nettlesome in academe's dealings with its Washington patrons, and it has even boiled over on Capitol Hill in connection with renewal of the Export Administration Act. The House version of that legislation states as a declaration of policy:

"It is the policy of the United States to sustain vigor-
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Guide to Export Controls

In the never-never land of export-control policy, the concept of "militarily significant emerging technologies," though vaporously defined, has inspired study of theological intensity, as can be seen from the following, excerpted from a paper produced last September by a group drawn from the Defense Department, NASA, the CIA, and other government agencies:

An emerging technology cannot be classified as "Militarily Significant" on the basis of purely theoretical "identification of potential uses." In addition to threat assessment, it must be defined in terms of stages of emergence and be supported by experimental evidence. Specifically, it must have progressed to the second stage of the emerging technology process identified above—First experimental device applications. (The quantitative first experimental device application stage in the Technology Development Cycle should not be confused with the "First Proof of Principle" experiment in the Scientific and Theoretical knowledge stage) [E]merging technologies are technical developments and applications that are transitioning through successive stages in a logical developmental sequence related to successive removal or resolution of the remaining uncertainties in the art that may constitute obstacles to realizing useful products or practices Basic science and emerging technologies interface at some point depending on specific events in the Technology Development Cycle While 6.1 [the DoD budget category for basic research] provides the science task which may eventually lead to an emerging technology or provide the precursor for emerging technology, very few of the 6.1 supported sciences spring immediately into Military [sic] Significant Emerging Technology. The exceptions, when identified, should be approved by high technical authority.

In Print

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(120 pages, \$9.25 domestic, \$11 overseas, National Academy Press, 2101 Constitution Ave. Nw., Washington, DC 20418; tel. 202/334-3318.)

Congressional Office of Technology Assessment *Annual Report to the Congress*, lists projects recently completed and underway at the increasingly prolific OTA, along with names of the hundreds of panelists and committee members who serve as OTA consultants.

(74 pages, no charge, Office of Technology Assessment, Publishing Office, 600 Pennsylvania Ave. Se., Washington, DC 20003; tel. 202/224-8996.)

Two new reports by OTA:

Technologies to Sustain Tropical Forest Resources, (GPO Stock No. 052-003-00943-9, 344 pages, \$10);

Wetlands, Their Use and Regulation, (GPO Stock No. 052-003-00944-7, 208 pages, \$8.)

(Available from Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

Cancer Facts and Figures, 1984, American Cancer Society's annual compilation of statistics on cancer incidence, mortality, and trends in the US, with some international data, and description of various ACS activities.

(31 pages, no charge, American Cancer Society, 777 Third Ave., New York, NY 10017.)

DoD R&D Share Hurts Economy, NSF Board Head Says

Science-policy circles in Washington regularly resound with expressions of dismay about the massive shift toward military research and development that has taken place under the Reagan Administration. Little of this, however, has come out into the open. But now there's an impressive exception—Congressional testimony by one of the pillars of the science establishment, Lewis M. Branscomb, Vice President and Chief Scientist of IBM and Chairman for the past four years of the National Science Board, the policymaking body of the National Science Foundation.

Testifying March 14 before the Subcommittee on Economic Stabilization of the House Banking, Finance and Urban Affairs Committee, Branscomb scoffed at the frequently raised contention that "spinoffs" from defense research benefit the civilian economy.

"Companies outside the defense sector," he said in a prepared statement, "generally discount the 'spinoff' of most defense/space research. One writer," he continued, "calls it 'drip off.'"

Rejecting the argument that R&D spending on mili-

tary programs helps the US civilian economy in competition with other nations, Branscomb said, "Any comparisons of US government investments in R&D to help the economy with those of other countries should discount the military R&D budget."

Branscomb pointed out that of the \$54 billion that the Reagan Administration proposes to spend for R&D next year, "some 75 percent is defense- and space-related, and the non-defense component is dwindling as a percentage of the total. In the three budget years 1983-85," he testified, "the defense component of federally funded R&D rose 36 percent while the non-defense component rose only 2 percent."

Discussing the economic impact of this imbalance, Branscomb said, "Expanding competition by defense/space programs for scarce R&D talent needed in the commercial sector may become an obstacle to economic progress. These effects," he said, "must be taken into account by the Executive and Congress in determining the defense budget and in evaluating the need

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Export Controls

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ous scientific enterprise. To do so requires the ability of scientists and other scholars freely to communicate their research findings by means of publication, teaching, conferences, and other forms of scholarly exchanges."

The Senate version, incorporating language introduced February 27 by Jesse Helms (R-NC), changes it to read "to communicate their *nonsensitive* research findings . . ." The difference between the two versions will have to be worked out in conference.

In an analysis of the language differences, Allan Adler, who monitors the export-controls issue for the American Civil Liberties Union, states that adoption of the Helms' version "would constitute a Congressional endorsement of the Executive Branch's theory and practice in recent efforts to use the export-control laws to restrict domestic dissemination of unclassified scientific ideas and technical information.

"It would clearly permit the Departments of Defense, State, and Commerce," Adler continues, "to continue such practices merely by characterizing particular domestic dissemination activities as 'special cases' in which 'sensitive' research findings require the application of export restrictions; in this sense," the analysis concludes, "enactment of the amended Senate version would be worse than legislating no 'declaration of policy' at all."

Restrictions on academic research and related matters were discussed March 22 at a five-hour meeting in

Washington of the Working Group on Export Controls of the DoD-University Forum, which is supposed to promote enlightened relations between the military and academe. The meeting was congenial, but virtually without accomplishment. The hardliners who have created most of the problems that concern the Forum pay it no more heed than the assignment of a watchful liaison representative. And the DoD people who were involved in the workshop, with Edith W. Martin, Deputy Undersecretary for Research and Advanced Technology, as their leader, are not the ones who are trying to put wraps around academic science.

Martin expressed dismay about the recently issued update of the National Academy of Sciences' 1982 study of controls on scientific communication (SGR Vol. XIV, No. 4), contending that it was erroneously gloomy about events of the past two years.

The problems cited are rare, she said, and the new "report itself is full of errors." But a memo from her office citing those alleged errors fails to point out a single one of substantive significance.

When one of the university representatives warned that security restrictions would force "some of the major research universities" to turn down research funds from the Defense Department, Martin responded that "major universities are a fluctuating thing." And she went on to predict that "when you get down to where the rubber meets the road," universities would be reluctant to forgo government research money.

... DoD's 70-Percent Share Cited at House Hearings

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for federal support for the growth of the academic enterprise that must supply manpower to both sectors."

The hearing at which Branscomb testified was focused on yet another Congressional effort to set up a new government agency to promote prosperity via the R&D route. This one, introduced by Chairman John J. LaFalce (D-NY), of the Economic Stabilization Subcommittee, would establish an Advanced Technology Foundation to support applied research.

With the National Science Foundation dear to the hearts of Congress, and yielding to those old pressures for faster payoffs in research, the idea of a neighboring foundation doing even more of the same is not likely to catch fire on Capitol Hill. But what is rousing Congressional concern is the blank check that the Administration wants for its military programs. Minor cuts have been agreed to in response to Congressional pressures for reducing the deficit. But, so far relatively little attention has been directed at the Administration's reallocation of federal R&D in favor of military programs.

One reason for lack of Congressional interest is that many of the scientists who are witness-chair regulars on

Capitol Hill have been won over by the Administration's attention to the financial problems of academic science. The "new" money devoted to those problems is pretty small stuff in comparison to the doubling of military R&D spending—from \$17 billion to \$33 billion—since 1980. But after expecting the worst and coming out not too badly, the mandarins of academic science have not been complaining bitterly to their friends on Capitol Hill.

That's what makes Branscomb's testimony all the more interesting politically and in harmony with Capitol Hill's growing feeling that American R&D policy is out of balance. In his opening statement at the hearings, Chairman LaFalce referred to his Subcommittee's previous hearings on international industrial competitiveness, and said:

"The trends are obvious and the implications are clear. For example, in Fiscal 1980, we spent 50 percent of our government R&D dollars on Defense. By Fiscal 1984, Defense gobbled up 70 percent of our government R&D dollar and most of the rest was devoted to aerospace and energy."

Harsh Words for IBM from MIT Engineering Director

While IBM's Chief Scientist, Lewis M. Branscomb, criticized federal R&D policy in his testimony to the House Subcommittee on Economic Stabilization, another witness, Myron Tribus, Director of MIT's Center for Advanced Engineering Study, had harsh words for IBM. Tribus testified for the National Society of Professional Engineers. Following are excerpts:

The so-called "fifth-generation computer" concept originated with my colleagues at MIT. It was picked up by the Japanese and made the central theme of MITI's (Ministry of International Trade and Industry) vision of the future. In the USA, our most powerful and significant company in the computer field, IBM, recently announced that it would not pursue this development . . .

As a matter of record . . . we should note that some of the biggest advances in computing were not pioneered by IBM, or for that matter, admitted by IBM until long after the fact. I was at Dartmouth when [President] John Kemeny and his colleagues pioneered time sharing and the BASIC language. It took four or five years after it was a commercial success for IBM to jump on this bandwagon.

Apple pioneered the personal computer and cre-

ated the market. IBM jumped in after it had been created and took a large market share. However, there are now on the market computers from Japan at half the price and with features comparable to the IBM PC. Even though IBM is one of our better producers, it is having trouble matching the Japanese quality and price. Had the Japanese pioneered the field, IBM might not have been able to enter. Just for the record I might note that I have been told by a colleague in Japan that he can purchase for me for under \$1500 a kit of parts to enable me to assemble the equivalent of the IBM PC in its most advanced form.

Maybe the decision on the part of IBM to not enter the competition for the fifth-generation computer is the correct one for the nation. But if it is not, the blow to our computer industry will be severe. Laser disk technology has been pioneered in the USA. But the first embodiments of it in high-fidelity sound equipment are coming from Japan . . .

We cannot sustain our position if we invent and they innovate. Yet the process of innovation is not the business of government. The government can foster innovation. Only the private sector can make it happen.

Big US Lead in R&D Funds Reported in NSF Study

The US is plainly the big spender in the non-Communist world of research and development, but just how big is made clear in a publication issued last week by the National Science Foundation, *International Science and Technology Data Update: Bigger than Japan, West Germany, France, and Britain combined*.

Figures for 1981 show the US spending \$72.1 billion on R&D, while the others lagged far behind, with Japan at \$27.1 billion; West Germany, \$15.8 billion; France, \$10.9 billion, and Britain, \$11 billion. Given the R&D boon that's taking place in the US, while recession persists in Western Europe, it's likely that the US lead today is even greater.

On the other side of the picture, however, the report confirms the well-known fact that the Japanese and Germans exceed the US in the proportion of national R&D funds devoted to civilian research—an estimated 2.66 percent for the Germans in 1983, compared to 1.75 percent for the US. In 1981, the most recent year estimated for Japan, a 20-year-long upward trend—still running—had brought the civilian R&D figure to 2.30 percent. Even so, the sheer bulk of R&D spending in the US is such that the US still outspends the other nations in financing civilian research.

The report also shows that the US has more scientists and engineers working in R&D than the other nations reported on combined. The US figure of 6 scientists or engineers per 1000 members of the working force also leads the others.

The "Update" in the title of the report refers to the latest edition of NSF's premier assemblage of R&D statistics and analyses, *Science Indicators 1982*, which, after long and pointless review at the White House Science Office and elsewhere, was finally made public in February (SGR Vol. XIV, No. 3).

(*International Science and Technology Data*

Update, 38 pages, is available without charge from the Division of Science Resources Studies, National Science Foundation, 1800 G St. Nw., Washington, DC 20550.)

Even with all that money coming its way, the defense establishment has fallen to squabbling about the internal division of the huge share of R&D resources that it commands. With the President's "Star Wars" missile defense program—now called the Strategic Defense Initiatives—scheduled for \$2 billion in R&D next year, the Pentagon's thin ranks of basic-research advocates are complaining of diversions from their funds, including money they had earmarked for university programs.

Like good soldiers, the managers of the Defense Department's basic research programs publicly insist that the financial situation is favorable, but a look at the numbers suggests that a lot of shuffling of funds is actually taking place to support the missile-defense program. "Obligations" for basic research—ie, authority during fiscal 1985 to commit the expenditure of money over a period of years—is up by a healthy amount, from \$815 in 1984 to \$939 million in the next fiscal year. But a lot of internal battling is underway over the more critical budget category known as "outlays," which is the amount available for spending in fiscal 1985.

Aviation Week, a persistent drummer for more R&D spending for every military and space category, complained in an editorial on March 26 that the Pentagon's basic research budgets "are declining as a share of the total research and development budget and have done so over the last two budgets Some of the change was caused by a revision in category for the Reagan Strategic Defense Initiatives work," the editorial continued. "It was pulled out of its former resting place . . . in the basic research accounts and moved into . . . advanced technical development."

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